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RESEARCH ARTICLE

REQUIREMENTS FOR UNIVERSITY LECTURERS IN VIETNAM BEFORE THE FOURTH INDUSTRIAL REVOLUTION

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ABSTRACT

The fourth industrial revolution brings many opportunities for Vietnam to accelerate industrialization and modernization in the development of country. However, like previous revolutions, the fourth industrial revolution has affected all aspects of social life with various degrees and directions. The education industry in general and the university lecturers in particular is one of the groups most strongly affected by this industrial revolution because training products for satisfying the needs of labor market on time have changed rapidly. In order to take advantage of this trend, the Vietnamese education sector should change radically and completely. The fourth industrial revolution also requires the lecturers to change their thinking and teaching methods in order to train high-quality human resources, meeting the social requirements in the current period.

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INTRODUCTION

In the current period, the world has the fourth industrial revolution. Besides speed and scope, the fourth industrial revolution can be seen as unique because of its harmony and ability to integrate many various fields and inventions. Visible innovations being the result of interactions between technologies are no longer science fiction. "By doing so, they are creating and even "evolving" objects that can continuously change and adapt features of the plant and animal kingdoms" (Schwab, K, 2016). The rapid change brought about by this revolution has created many changes in the structure and quality of human resources, especially high-quality human resources. Such human resources need not only knowledge and experience, but also the ability to quickly solve practical problems and think creatively. In Vietnam, through decades of development, the team of high-quality human resources in the fields of science, engineering, technology and industry has been built and developed in large numbers. Many scientific, technical, and technological achievements have promoted the development of the country associated with high-quality human resources in this field. However, in many aspects, the high-quality human resources, including university lecturers, have not yet met the requirements of the construction and development of the country at the current new period. In accordance with the statistics from the Ministry of Education and Training of Vietnam, currently, only 55% of universities in the whole education sector have achieved the average level of digital transformation, which is only at the level of 1

to 3 of the 6 levels of digital transformation in education(Dan Tri, 2022). On the other hand, the transition from a centrally-planned, administrative, bureaucratic and subsidized economy to a market economy regulated by the State requires a transformation of management institutions that must be synchronized and suitable to set the premise for the development of various fields. Another challenge for universities is the "brain drain", which has been happening and is expected to increase sharply in the near future. It is a source of high-quality labor tending to move to more developed countries. In that context, it requires the university lecturers to change their thinking and teaching methods to catch up with the advances of the fourth industrial revolution.

RESULTS

Overview of the fourth industrial revolution: Information technology in the industrial revolution 4.0 has great potential to connect billions of people, significantly improve the efficiency of businesses and organizations, and help recreate the natural environment through better property management (Schwab, K, 2016). The fourth industrial revolution makes the difference between a traditional factory and an industrial factory in the four revolution providing high-quality products or services at low cost.(Lasi, H., Fettke,P., Feld,T., Hoffmann,M, 2014).Currently, the fourth industrial revolution has been emerging from the third evolution, characterized by the fusion of technologies, blurring the boundaries between the physical, digital

and biological fields, with the focus on developing artificial intelligence, robotics, Internet of Things, material science, biology, and extensive interdisciplinary wireless mobile technology for manufacturing automation (Schwab, K, 2016). Obviously, the products of the fourth industrial revolution are based on intelligent automation. Automation in the fourth industrial revolution is different from the third industrial revolution in the ability to interact and improvise with environmental factors during real-time operation thanks to the intelligent management of AI trained on big data and Internet connection. AI has the ability to draw the rules from big data analysis, making effective decisions which are often surprising compared to human thinking. IoT serves as an environment connecting not only data with data, but also with AI, machinery, equipment and people, making all of them become a unified whole. The role and combination of big data, AI and IoT have been analyzed by many documents as well as published by the press and media. In general, it can be seen that the fourth industrial revolution has the following main technical characteristics:

Firstly, the principle of integration between 3 platforms of Big Data, AI and IoT is general in all applications. However, upon its application, such principle is very object-specific based on the data obtained on it. That is, when applying the fourth industrial revolution on any object, the first thing to do is to collect data on such object. The more complete, detailed and systematic information on the object is, the more effective the application of AI will be, reducing the bias of AI when making decisions in the later process of system operation. It can be said that data is a crucial first step, guiding the development of AI and IoT, determining the success level of the fourth industrial revolution upon its application.

Secondly, the fourth industrial revolution is systematic and connected between stages of the product creation process such as production, processing, logistics, market, and management, based on detailed data sources and system of the object of interest. This data includes multi-layered and multi-dimensional information on the object such as structure, function, operation, factors affecting function and operation, market, needs and preference of the user, etc.

Thirdly, the operation of the fourth industrial revolution is based on the interaction between the system and the information / the interaction from the real-time environment through IoT, making the operation of the system very flexible, improvising and creating intelligent effects. This is the difference in the nature of intelligent automation between the fourth industrial revolution and the third industrial revolution.

Fourthly, in terms of application scale, the fourth industrial revolution can be widely applied in many fields related to research, production, business, service, management and administration, with all levels from individuals to organizations, businesses and society as a whole.

Fifthly, the operation of the fourth industrial revolution is based on the exploitation and use of knowledge. However, it is also a tool to create new knowledge and new modes of operation.

Requirements for Vietnamese universities before the fourth industrial revolution: Although the fourth industrial revolution has just been born in recent years, its effects have been changing and will change systematically the whole life of mankind. For the first time, these effects were mentioned in the Document of the 13th Congress of Vietnamese Communist Party. Accordingly, the Vietnamese Communist Party defines: “The fourth industrial revolution has developed strongly, creating breakthroughs in many fields, bringing both opportunities and challenges to all countries” (Vietnamese Communist Party, 2021). The fourth industrial revolution has put higher education in front of many new challenges. With the rapid change of technology, it is required that the education gives the learners both new knowledge and skills, creativity, and adaptability to new challenges and requirements that traditional educational methods have not been able to meet. This is a big challenge, especially in the context that the Vietnamese higher education has been showing many

limitations. In recent years, education reform has taken a lot of effort but has yielded no results, with spontaneous training activities and lack of cohesion between training and employment. There are many reasons, one of which is the lack of interaction between the State and the market. The market has not become a basis for evaluation, selection and employment. Labor surplus is common causing great waste. The connection between universities and businesses in training, scientific research and technology transfer in Vietnam has been still weak. There is a lack of institution to create favorable conditions and environment for connection and expansion of autonomy for some areas of applied research, training coordination and commercialization of research results. Although the State has a policy to encourage lecturers and students to publish their studies in international journals for universities training basic science, there has been no close association with businesses to carry out applied research with appropriate forms for universities of engineering and technology. Research on transfer and research coordination associated with the practical requirements of businesses have been still being at a modest level. The structure of training majors is basically spontaneous, without a clear orientation. The trend of studying is to secure a current life, not paying enough attention to the personal potential and expectations as well as the development trends of the times and the requirements of the country. Many students are good at natural sciences but choose to majors in economics, business administration, finance, banking, foreign trade, ... However, if they really know how to seize the opportunity brought about by this revolution, the training quality of universities may be significantly increased. However, it may be also reduced, depending on the reasonable policies of the State and of each university. Universities themselves must be well prepared and adapt to this new period, because they cannot predict the skills that the labor market will need in the near future due to rapid change of technology. In the fourth industrial revolution, there are four important factors interacting with each other in every university: human resources, training, research and self-change process. In particular, the self-change process takes place in many different aspects, such as innovation in management thinking, proper appreciation of the value of innovation and creativity, philosophy of training, investment in information technology infrastructure and advanced laboratories. The most important thing to be done at this stage by the universities is to build an Industry 4.0-oriented university program. In order to satisfy the needs of training future human resources for the fourth industrial revolution, the universities in Vietnam should gradually develop training program, considering factors such as: career orientation and relevant extended skills; investment in equipment for researching and teaching; supplementation of knowledge and skills for teaching and research forces. At the same time, coordinate with multinational enterprises to carry out the process of technology transfer, training, research and application development in a practical way. Even the education oriented to the fourth industrial revolution also requires the universities to create foundational knowledge for students in the teaching process, while the learners must self-study for life regarding the other “soft skills” to keep up with reality. The universities should design their more flexible curricula and more up-to-date knowledge, geared towards development of skills relevant to the fourth industrial revolution and development of systematic and interdisciplinary thinking.

This is probably not only required at the university level, but it is necessary to start from the lower levels, because advanced knowledge and skills need to be accumulated and built from the most basic foundations. In addition, technology has been gradually helping to personalize training instead of teaching a common program like today. For example, artificial intelligence technology will help to clearly identify the strengths and weaknesses of each person to offer a separate training program accordingly. Therefore, the universities should promote communication channels so that students, trainees and postgraduate students can actively seize the opportunities and choose study programs suitable for their training positions, scientific research or work at agencies, businesses and economic organizations. Besides, all training and scientific research activities of universities will face new requirements of reform and competition in the future.

In parallel with building training programs and improving training quality towards the Industry 4.0, renewing the university model is a very necessary solution. There is a need for a drastic shift to a “what the market will need” training model. In accordance with this new model, the connection between vocational education institutions and businesses is a given requirement. At the same time, the process of promoting the formation of training institutions is necessary to share common resources.

Requirements for lecturers from Vietnamese universities before the fourth industrial revolution: In the fourth industrial revolution, lecturers must be active and eager to accept it as an opportunity, and at the same time consider it as a challenge to overcome. The teacher must define the issue in need of special attention in the current period as the current target audience of learners being far different from the ones in the previous period. If, in the past, the learners studied to participate in a few fields, the learners are interested in many field. It is this wisdom helping them survive and adapt in a changing society. Therefore, there must be a different approach, not like the old one. The lecturers must pay attention to each person because the needs of each student are very different. The main task of lecturers is to create a learning environment, enabling them to have the opportunity to learn in a positive and creative way. The teacher must move from the role of traditional knowledge transmission to the role of catalyst and coordinator and to the function of guiding learners and taking them as the center of the teaching process. In the digital age, people can access endless information and resources from anywhere with just the click of a button. Teaching and learning have been currently being influenced strongly by the technological revolution. In the fourth industrial revolution, the value of lecturers is not only to impart knowledge, but also to guide and support students to self-direct in learning, and at the same time, they must help students adjust their orientation in terms of quality and signification of the information source. The lecturers must be professional educators with creative, critical and independent thinking, as well as capable of active cooperation and effective support between learners and what they want to know. They must be the ones who provide new understanding for the learners. In order to satisfy such need, the lecturers must return to three very important functions: the creativity function, the criticism function and the education function. The blend between the intellectual level of scientists and educators at the university level is the foundation for the lecturers to stand firm in the future. For pedagogical lecturers, their capacity and quality must also be based on the teacher background, which is the connection between the capacity of educator and that of scientist (an excellent teacher in high school, an expert in university). As a teacher, one of the important things is to always have new ideas, acting as a person guiding, enlightening, promoting, exploring and facilitating. The “most creative” function of the teacher “among the creative professions” is even more evident in the present time.

Several solutions for improving teaching efficiency for lecturers from Vietnamese universities before the fourth industrial revolution: First, build a capacity framework for the lecturers to meet new requirements. This is the basis for building and perfecting the professional standards of lecturers, being a measure of modern education quality management, being the basis for the lecturers to self-assess their own qualities and capacities, being the parameter for quality inspection and assessment, and creating the ground and basis for building and developing training and retraining programs as well as remuneration benefits and policies for the lecturers. The capacity framework of lecturers in the context of international integration should have a minimum of standards such as: professional ethics, lifestyle (passion, preservation of prestige, quality and honor of teacher, discipline respect, etc.); professional knowledge and capacity (in-depth specialized knowledge, multicultural understanding, constant improvement of foreign language and informatics, etc.); pedagogical capacity (development of teaching plans and subject curricula, modern methods, application of information technology, etc.); scientific research (participating in scientific research in scientific research topics at all levels and seminars, writing books, etc.); practical activities and socio-political

activities (participating in practical research, drawing experience, grassroots practice and seconding for a limited time, etc.); professional development and self-development (career development goals, self-assessment, self-study, etc.). On the basis of that appropriate system of standards, the school management has a plan to disseminate and introduce the capacity framework to the lecturers throughout the school system. At the same time, use the capacity framework as a standard basis in planning, recruiting, training, fostering, developing service conditions, creating remuneration mechanisms and policies, and testing and assessing the lecturers in the management and development of the lecturers.

Second, innovate teaching methods for lecturers: The universities should regularly assess and analyze the professional capacity of the lecturers to define the needs and organize the training and retraining to supplement and perfect the system of knowledge, skills and professional attitudes in accordance with the output standards of the training program, meeting the strategic development goals of the universities in the fourth industrial revolution. During the teaching process, the lecturers must regularly update new knowledge; the teaching content must be closely linked and in appropriate with the practical requirements of the unit, and at the same time, they must be able to combine and connect it with knowledge from other subjects, using a variety of teaching methods in the principle of “taking the learners as the center”, reducing the maximum amount of lecture hours in class so that the learners have time to study and research on their own.

Third, promote the application of information technology and simulation technology in teaching: This is an essential content, with good application and good use of the achievements of the fourth industrial revolution as a basis for improving the quality of teaching and learning. Therefore, it is required to promote the application of information technology, digital technology and simulation technology in the teaching process. Computer simulations have the ability to provide a much deeper and more comprehensive amount of knowledge than just using textbooks and documents. Lectures with the application of simulation technology combined with modern audio-visual facilities will create a lot of excitement for students. It maximizes their cognitive ability, all sensory organs together with the brain to form a system for perceiving the lesson content. When teaching and learning with the application of simulation technology, the students will experience indirectly. Through those experiences, they are developed in knowledge and skills, thereby forming attitudes and responsibilities, stimulating enthusiasm in learning. In order to acquire these competencies, departments and faculty members should define it as a task, concretize it in their working plans, and determine the measures to be taken in appropriate with each department and each faculty.

Fourth, improve the capacity of using technological means for the teaching and learning process for the lecturers: The fourth industrial revolution is a “digital revolution”, so the lecturers must be able to manage network resources and be able to competently use technological means for the teaching and learning process. In order to acquire these competencies, the universities should focus on fostering the capacity of using technological means for the teaching process by opening short-term training courses or organizing exchange and sharing sessions for the lecturers with effective information technology application skills in teaching and the lecturers with weak computer skills. This should be done regularly and the following contents should be focused on continuously: how to digitize lecturers, teaching materials, uploading to the electronic library for easy access by the students and easy control by the lecturers with new updates every year; how to design online classes, build learning and academic exchange forums on the Internet; training in using electronic libraries, exploiting endless resources on the Internet for teaching. In addition, in order to facilitate the development of this capacity of the lecturers, the universities should publish technological means that the lecturers can use to support the teaching process. When the lecturers manage and understand the available teaching means, they will be more active

and creative in applying technology and allow, as well as guide, their students to use it so as to improve the learning process.

Fifth, improve foreign language skills for the lecturers: In order to access advanced scientific and technological knowledge brought about by the development of the fourth industrial revolution, the lecturer cannot help but be fluent in foreign language. This is a necessary condition for the lecturers to integrate with the trend of globalization connection and integration with world higher education. Therefore, the universities should focus on promoting the lecturers to meet foreign language standards and always improve their foreign language skills. At the same time, the universities should create more conditions to help the lecturers improve their foreign language skills, such as enhancing academic activities in English, teaching specialized courses in English so that both lecturers and students have conditions to study in depth their major in English; introducing and training the lecturers on how to write articles and how to contact and submit articles in international conferences and journals in accordance with the characteristics of each major in English.

Sixth, strengthen international cooperation: Cooperating with prestigious higher education institutions in the world and in the region and honoring the teaching profession go hand in hand with giving prominence to the innovation of teacher role. At the same time, developing mechanisms and policies to create favorable conditions to strongly attract and use the available foreign investment sources for the training of lecturers in order to improve the teaching profession capacity in the digital age. In the trend of globalization in all fields of socio-economic life, including the fields of science and education, international cooperation expansion is one of the crucial measures to improve the education and training quality. Through the international cooperation activities, the lecturers are updated with new knowledge and skills in research and teaching; innovating material and technical facilities through cooperative projects; saving the training and research expenditures. The expansion of cooperation with countries with advanced training levels in the world will help the lecturers improve their quality and prestige on the regional and international scale. Enhance the sending of lecturers to study and research, exchange experiences and academic exchanges with training institutions and universities in countries with many achievements and experiences in economic, scientific and technological development. Invite scientific experts and international scholars in a number of scientific fields related the expertise of lecturers to provide training courses, seminars or refresher courses on the innovation of curricula, teaching and learning materials and active teaching and learning methods, improving the professional qualifications for the lecturers.

CONCLUSION

If previous industrial revolutions took place at an additive (or liner) speed, the growth rate of this fourth industrial revolution is exponential (World Economic Forum, 2016).

The time, since technology and innovation ideas were conceived, such ideas were realized in laboratories and were commercialized on a large scale, and the new products and processes were created on a global scale, has been significantly shortened. Technological breakthroughs taking place in many fields at a very fast pace and interacting with each other have been creating a digitized and automated world which has been becoming more efficient and intelligent. Technology and human capital are the two most critical factors in endogenous growth models. Unlike other inputs (capital, labor, land, natural resources) that are always bound by the ceiling limit, these two factors can be increased without being blocked by the ceiling and are therefore the key for the countries to be able to escape the middle-income trap. Thus, these are the most important contents in the development strategies of successful countries. In Vietnam, education and training have always played an important role in government policies and family investment.

On the basis of analysis of the above contents, it can be seen that, in the current context of constantly developing science and technology, the innovation of thinking and teaching methods to create a high-quality workforce has been becoming more essential than ever. That change must start from the mindset of insiders, who are educators, including universities and lecturers, because, in this fourth industrial revolution, the factors that developing countries like Vietnam have been considering as advantages such as young and abundant labor force will no longer be the strengths. In the future, people may face many difficulties in finding jobs, because the craft fields can now be affected and even done better by machines. It requires the teachers to constantly improve themselves, make themselves stand in a higher position, be able to control machines intelligently and rationally, so that they are not eliminated among many advanced technologies.

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